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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,757	04/02/2004	Kouji Sumi	1089.0260003/ALF	9954

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STERNE, KESSLER, GOLDSTEIN & FOX PLLC
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
TUGBANG, ANTHONY D	
ART UNIT	**PAPER NUMBER**
3729	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/815,757	SUMI ET AL.	
	Examiner	Art Unit	
	A. Dexter Tugbang	3729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18-27* is/are pending in the application.

4a) Of the above claim(s) *27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/236,110.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/12/04, 12/14/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of the invention of Group I, Claims 21-26 in the reply filed on November 4, 2005 is acknowledged.

2. Claim 27 has been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on November 4, 2005.

Priority

3. It is noted that this application appears to claim subject matter disclosed in prior Application No. 09/236,110, filed January 25, 1999. A reference to the prior application must be inserted as the first sentence(s) of the specification of this application or in an application data sheet (37 CFR 1.76), if applicant intends to rely on the filing date of the prior application under 35 U.S.C. 119(e), 120, 121, or 365(c). See 37 CFR 1.78(a). For benefit claims under 35 U.S.C. 120, 121, or 365(c), the reference must include the relationship (i.e., continuation, divisional, or continuation-in-part) of all nonprovisional applications. If the application is a utility or plant application filed under 35 U.S.C. 111(a) on or after November 29, 2000, the specific reference to the prior application must be submitted during the pendency of the application and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior application. If the application is a utility or plant application which entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the specific reference must be submitted during the

pendency of the application and within the later of four months from the date on which the national stage commenced under 35 U.S.C. 371(b) or (f) or sixteen months from the filing date of the prior application. See 37 CFR 1.78(a)(2)(ii) and (a)(5)(ii). This time period is not extendable and a failure to submit the reference required by 35 U.S.C. 119(e) and/or 120, where applicable, within this time period is considered a waiver of any benefit of such prior application(s) under 35 U.S.C. 119(e), 120, 121 and 365(c). A benefit claim filed after the required time period may be accepted if it is accompanied by a grantable petition to accept an unintentionally delayed benefit claim under 35 U.S.C. 119(e), 120, 121 and 365(c). The petition must be accompanied by (1) the reference required by 35 U.S.C. 120 or 119(e) and 37 CFR 1.78(a)(2) or (a)(5) to the prior application (unless previously submitted), (2) a surcharge under 37 CFR 1.17(t), and (3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(2) or (a)(5) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional. The petition should be addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

If the reference to the prior application was previously submitted within the time period set forth in 37 CFR 1.78(a), but not in the first sentence(s) of the specification or an application data sheet (ADS) as required by 37 CFR 1.78(a) (e.g., if the reference was submitted in an oath or declaration or the application transmittal letter), and the information concerning the benefit claim was recognized by the Office as shown by its inclusion on the first filing receipt, the petition under 37 CFR 1.78(a) and the surcharge under 37 CFR 1.17(t) are not required.

Applicant is still required to submit the reference in compliance with 37 CFR 1.78(a) by filing an amendment to the first sentence(s) of the specification or an ADS. See MPEP § 201.11.

4. It is further noted that the Transmittal Letter filed on April 4, 2004 does include an amendment to the first page of the specification that correctly references prior application, Application No. 09/665,314. However, this reference does not include the current status of the prior application, i.e. that the application matured into a U.S. 6,194,818.

Specification

5. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:
(1) if a machine or apparatus, its organization and operation;
(2) if an article, its method of making;
(3) if a chemical compound, its identity and use;
(4) if a mixture, its ingredients;
(5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

6. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

7. The abstract of the disclosure is objected to because the content is not directed to the claimed invention, i.e. process of making, and is not limited to one, single paragraph. Correction is required. See MPEP § 608.01(b).

8. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: A Process of Making a Piezoelectric Thin Film Component.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

10. Claims 18-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 18, it is unclear from the disclosure what is meant by the phrase of "an island-like way" (line 4), which renders the claims as being vague, indefinite, misleading, and confusing.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by the publication to Klee et al, titled "Analytic Study of the Growth of Polycrystalline Titanate Thin Films".

Klee discloses a method of manufacturing a piezoelectric thin film component comprising: depositing a thin metal on a bottom metal layer, or bottom electrode, such that parts of the thin metal film remain on crystal boundaries of the bottom metal layer and form seed crystals; and forming a polycrystalline piezoelectric thin film on the bottom metal layer so that a pervoskite crystalline lattice is grown from the seed crystals through various forms of annealing (all of which is discussed at p. 264 in the 2 paragraphs under the section of "Experiments").

As best understood, in Klee's Figures 5a-5c, this shows the grain structure of the seed crystals being deposited in an "island-like way" and the crystal grain structure having a (100) plane orientation (see page 272).

Regarding Claim 19, Klee suggests the composition of titanium as the thin metal film that makes up of the seed crystals (see p. 265).

Regarding Claim 20, Klee further teaches that the piezoelectric thin film is a (100) plane orientation (see p. 269) with a grain size of 0.3 μm (see p. 272).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 18, 19, 21, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paz de Araujo et al 6,056,994 in view of Klee et al.

Regarding Claims 18 and 21, Paz de Araujo discloses a method of manufacturing a piezoelectric component comprising: depositing a thin metal on a bottom metal layer, or bottom electrode, such that parts of the thin metal film remain on crystal boundaries of the bottom metal layer and form seed crystals (P20 in Fig. 14); and forming a polycrystalline piezoelectric thin film on the bottom metal layer so that a pervoskite crystalline lattice is grown from the seed crystals by:

forming a film of a sol composition having superlattice materials on the seed crystals, where the sol composition includes a high molecular organic compound mixed therein (see col. 5, line 64 to col. 6, line 59); heating the film of the sol composition at a temperature between 200° C and 600° C to gelatinize the film and to remove the organic compounds from the film thereby forming a porous gel thin film comprised of amorphous metal oxides (P23 in Fig. 14); baking the porous gel thin film at a temperature between 700° C to 800°C in a preannealing process until the gel thin film is uniformly crystallized and transformed into a crystalline metal oxide film (P24 in Fig. 14); repeating the above recited steps to laminate consecutive layers of a substantially integrated crystalline thin film (as indicated by the flowchart in Fig. 14);

performing a final annealing of the above films such that pervoskite crystal growth occurs and a polycrystalline piezoelectric thin film is formed on the bottom electrode (P30 in Fig. 14); and forming a top electrode on the formed piezoelectric thin film. In Figure 4, Paz de Araujo suggests the top and bottom electrode films 332, 328 with deposited films on a substrate 322.

Regarding Claims 19 and 22, Paz de Araujo further teaches seed crystals of titanium (see col. 6, line 31) and that the multitude of metal components themselves forming the piezoelectric or ferroelectric thin films are substantially maintained throughout the formation.

Paz de Araujo teaches substantially all of the limitations of the claimed manufacturing method except that the seed crystals are deposited in an "island-like way".

Klee shows deposition of seed crystals in an island-like way (in Figures 5a-5c) to achieve grain structures and certain electrical characteristics of the piezoelectric electronic device (see Abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Paz de Araujo by depositing the seed crystals in "an island-like way", as taught by Klee, to positively achieve particular grain structures and electrical characteristics of the piezoelectric electronic device when manufacturing.

Regarding Claim 23, Paz de Araujo further teaches that the sol composition is comprised of a metal alkoxide and a main solvent (see col. 7, lines 24-33). However, it would have been an obvious matter of design choice to choose any desired specific composition of main solvent, since applicants have not disclosed that the claimed *2-n-butoxyethanol*, solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the main solvent composition taught by Paz de Araujo.

15. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paz de Araujo et al in view of Klee et al as applied to claims 18, 21, 22 and 23 above, and further in view of Lipeles et al 4,963,390.

Paz de Araujo, as modified by Klee et al, teaches the claimed manufacturing method as previously discussed. The modified Paz de Araujo method does not teach a hydrolysis inhibitor added to the sol solution.

Lipeles suggests that a hydrolysis inhibitor added to the sol solution can be used to control the drying and affect the structure of the composition of the sol solution with the metal oxide (see col. 1, lines 50-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have improved the modified Paz de Araujo method by including a hydrolysis inhibitor, as taught by Lipeles, to positively control the drying of the sol composition with the metal oxide.

Regarding Claims 25 and 26, it would have been an obvious matter of design choice to choose any desired composition for the hydrolysis inhibitor and high molecular organic compound and sol mixture, since applicants have not disclosed that the specific claimed compositions for each (in claims 25 and 26), solve any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the compositions taught by Paz de Araujo, Klee and Lipeles.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The publications cited to Bell et al and Yamaguchi et al are relevant as to the piezoelectric thin film components being formed by sol-gel processing.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570. The examiner can normally be reached on Monday - Friday 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. Dexter Tugbang
Primary Examiner
Art Unit 3729

January 13, 2006